

Example #19: Find the % efficiency of a long hit baseball of mass 200 g; the ball leaves the bat at 18 m/s and is caught in the field (same height as when it was hit) at a speed of 14 m/s.

$$\text{at start: } E_T = E_k = \frac{1}{2} (.2)(18)^2 \\ = 32.4 \text{ J}$$

$$\text{when caught: } E_k = \frac{1}{2} (.2)(14)^2 \\ = 19.6 \text{ J}$$

$$\% \text{ efficiency} = \frac{E_{k \text{ out}}}{E_{T \text{ in}}} \times 100 \\ = \frac{19.6}{32.4} \times 100$$

$$\boxed{\text{Eff.} = 60 \%}$$